

Smith, Clifford L.

10/798.768

In The Claims

This listing of claims replaces all prior versions and listing of claims in the application.

1. (Currently amended) A composite tool coating method for a tool service area having a tool service area thickness and tool serviceability requirements, said method comprising:

preparing said tool service area for coating, said tool service area having a beginning said tool service area thickness;

electroplating at least one layer of plate coating material to said prepared tool service area, said at least one layer of plate coating material having a plate coating thickness, said plate coating material ~~is containing nickel~~, a plated service area thickness equaling said beginning tool service area thickness plus said plate coating thickness; and

spraying at least one layer of spray coating material to said at least one layer of plate coating material, said at least one layer of spray coating material having a spray coating thickness, a sprayed service area thickness equaling said plated service area thickness plus said spray coating thickness.

2. (Original) The method of claim 1 wherein said preparing step further comprising:

cleaning said tool service area.

3. (Original) The method of claim 1 wherein said preparing step further comprising:

abrading said tool service area to remove inconsistencies and reduce said tool service area thickness to said beginning tool service area thickness as needed.

Smith, Clifford L.

10/798,768

4. (Previously presented) The method of claim 1 wherein said electroplating step further comprising:

at least one transitional finishing step to remove inconsistencies in said at least one layer of plate coating material.

5. (Original) The method of claim 4 wherein said transitional finishing step further comprising:

abrading said at least one layer of plate coating material to remove inconsistencies and reduce said plate coating thickness to achieve a desired said plated service area thickness.

6. (Original) The method of claim 4 wherein said transitional finishing step further comprising:

baking said at least one layer of plate coating material.

7. (Previously presented) The method of claim 1 wherein said electroplating step further comprising:

at least one subsequent plating step to increase said plate coating thickness and achieve plate layer requirements.

8. (Previously presented) The method of claim 1 wherein said electroplating step further comprising:

at least one transitional evaluating step to inspect said tool service area and said tool service area thickness for compliance with plate layer requirements.

Smith, Clifford L.

10/798,768

9. (Original) The method of claim 1 wherein said spraying step further comprising:

at least one transitional finishing step to remove inconsistencies in said at least one layer of spray coating material.

10. (Original) The method of claim 9 wherein said transitional finishing step further comprising:

abrading said at least one layer of spray coating material to remove inconsistencies and reduce said spray coating thickness to achieve a desired said sprayed service area thickness.

11. (Original) The method of claim 1 wherein said spraying step further comprising:

at least one subsequent spraying step to increase said spray coating thickness and achieve spray layer requirements.

12. (Original) The method of claim 1 wherein said spraying step further comprising:

at least one transitional evaluating step to inspect said tool service area and said tool service area thickness for compliance with spray layer requirements.

13. (Original) The method of claim 1 further comprising:

a final finishing step after said spraying step to achieve said tool serviceability requirements.

14. (Original) The method of claim 13 wherein said final finishing step further comprising:

cleaning said composite tool coating to remove foreign substances and materials.

Smith, Clifford L.

10/798,768

15. (Original) The method of claim 13 wherein said final finishing step further comprising:

polishing said composite tool coating to remove slight inconsistencies.

16. (Original) The method of claim 13 wherein said final finishing step further comprising:

evaluating said composite tool coating, said tool service area and said tool service area thickness for compliance with said tool serviceability requirements.

Claims 17-25 (Cancelled).

Smith, Clifford L.

10/798,768

III. Remarks Concerning the Claim Amendments

Claims 1-16 remain pending in the application. Claim 1 is currently amended. Claims 4, 7 and 8 were previously amended in Applicant's first Response to Office Action.

Claim 1 has been amended to claim that the plate coating material is nickel, as discussed in the declaration. This amendment does not mean that other species of plate coating materials containing nickel are not also effective in the disclosed process. The applicant reserves the right to present proof of effective results with other plate coating materials containing nickel. This amendment makes the claims commensurate in scope to the information and arguments presented both previously and presently.

IV. Response to Examiner's Section 103(a) Rejections

To establish a prima facie case of obviousness, [1] there must be some suggestion or motivation to modify the reference or combine the reference teachings; [2] there must be some reasonable expectation of success; and [3] the prior art must teach or suggest all the claim limitations. MPEP § 706.02(j).

There is no suggestion or motivation to modify or combine the teachings of the Watson et al. patent (US 6,073,648) (hereinafter "Watson") and the Oshima et al. patent (US 4,889,602) (hereinafter "Oshima"). Watson teaches that "noble metals include gold, silver, platinum, palladium and alloys of these metals." Column 2, lines 32 & 33. Further, Watson teaches that in some "particular applications, metals such as tin, zinc, niobium or columbium and the like behave as noble metals and are accordingly considered a noble metal herein." Column 2, lines 35-38. This presentation appears to leave the scope of what may be a noble metal open to vary.

Smith, Clifford L.

10/798,768

But, the prior teaching of Oshima, of applying an undercoat of nickel alloy, is specifically addressed in Watson, in column 3, lines 4 & 5. Watson teaches that such a coating is considered a substrate that must be protected by a noble-metal layer, which is subsequently covered by a ceramic layer. Column 3, lines 16-25. Whatever the scope of noble metal is that Watson teaches, a nickel coating is not included. It would be inconsistent for Watson to support teaching that nickel material acts as a noble metal, if Watson expressly teaches that nickel material is a substrate that requires being covered by a noble metal. As such, Watson teaches away from being combined with Oshima. More importantly, Watson teaches away from the current invention, because Watson requires the plating material, which in claim 1 is nickel, to be covered by a noble metal, which may be many metals except nickel, prior to the HVOF spray metal coating. As such, Watson teaches away from the current process.

V. Response to Examiner's Comments Regarding Declaration Under 37 CFR 1.132

The inventor's declaration, dated July 25, 2005, provides information regarding experience with the coating process of the current application. The declaration provides first-hand information on a species of the current coating process, comprised of a nickel subcoat with an HVOF spray metal topcoat.

A. Unexpected Results

A chart is presented on page 3 of the declaration. Part life duration is shown for three coatings for use in a dynamic wear drilling environment. The coatings are presented in columns; with the first two columns being coatings known to those having ordinary skill in the art – nickel chrome, and HVOF spray metal, sprayed directly to a base metal. The third column is a coating of the current process – plain nickel with an HVOF spray metal topcoat.

Smith, Clifford L.

10/798,768

Nickel chrome is known to one having ordinary skill in the art to be superior to plain nickel as a coating in a dynamic wear environment. To one having ordinary skill in the art, the chart effectively demonstrates that the effect of the current process is far greater than one with ordinary skill in the art would anticipate from the combination of an HVOF spray metal coating over plain nickel coating (not even nickel chrome).

B. Commercial Success

In light of amended claim 1, where the claimed feature is electroplated material that is nickel, as presented in the declaration, the commercial success is of the claimed feature. The declaration, in the last full paragraph on page 3, discusses the surge in business created by customer experience with parts coated with the current process. It would be inappropriate to make more specific information about the customers public, since they are achieving a competitive advantage from using the part. Since the inventor made the declaration he has expressed that his demand for the product has continued to grow.

C. Long Felt Need

The declaration presented two problems recognizable by one having ordinary skill in the art.

1. Part life is too short and needs to be extended.

At this point total elimination of serious failure seems unreasonable. The declaration, starting at the bottom of page 3, provides proof of unsuccessful efforts of customers of the inventor. The inventor understands the information to be true, and one having ordinary skill in the art would similarly know the information is true, and appreciate reasonable costs of such efforts.

Smith, Clifford L.

10/798,768

One having ordinary skill in the art understands that each day of uninterrupted service obtained from a part equates to substantial operating cost savings. Durability of the parts made by the current process, as shown in the declaration, is seen by one with ordinary skill in the art as a substantial improvement.

2. The use of hexavalent chromium is under scrutiny.

Besides the efforts of the customers to seek durability, awareness of the hazards of chromium has drawn the attention from United States governmental agencies. The EPA has warned of the hazards of hexavalent chromium for a number of years.¹ More recently, OSILA increased control limits on hexavalent chromium due to its recognized increase hazard as a carcinogen.² Accordingly the government has been actively seeking alternative replacements for hexavalent chromium. This invention is a viable alternative for many applications where other alternatives have not proven adequate, and one with ordinary skill in the art would appreciate the impact of the invention. As mentioned in the declaration, both private and government efforts have committed substantial time and money unsuccessfully searching for an effective alternative. This substantial effort would be known and appreciated by one having ordinary skill in the art. As shown in the declaration, the current process provides an effective solution.

¹ <http://www.epa.gov/ttnatw01/hlthcf/chromium.html>

² <http://www.osha.gov/SLTC/hexavalentchromium/recognition.html>, <http://www.nmfc.org/pcl2.cfm>, and http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=FEDERAL_REGISTER&p_id=18599.

Smith, Clifford L.

10/798,768

VI. Conclusion

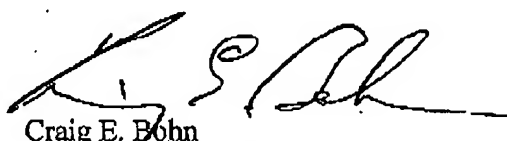
The cited prior art does not meet the requirements to establish a prima facie case for obviousness. The prior art is expressly contrary to suggesting or motivating one to modify the reference or combine the reference teachings to achieve the current invention as claimed in claim 1. The prior art discusses a sub-coating and teaches treating it like a metal substrate that needs to be covered with noble metal.

Though upon reading the disclosure the invention may appear simple and obvious, the objective evidence demonstrates that to those with ordinary skill in the art it is non-obvious and in high demand.

As amended, Claim 1 should now be suitable for allowance. Since all the remaining claims depend from Claim 1, all of the remaining claims should also be suitable for allowance.

The applicants respectfully request reconsideration of the rejection of these claims, and the issuance of a notice of allowance of all pending claims.

Respectfully submitted,



Craig E. Bohn
Registration No. 52,629

July 11, 2006
Law Office of Craig Bohn
2134 Branard Street
Houston, Texas 77098
(713) 874-0607
(713) 874-0591 Fax